

Norovirus & Other Caliciviruses

(Norovirus is also known as Norwalk virus or Norwalk-like virus;
Calicivirus is also known as Small Round Structured Virus [SRSV])



Section 1:

ABOUT THE DISEASE

A. Etiologic Agent

Caliciviruses (*Caliciviridae*) are a family of non-enveloped, single-stranded RNA viruses. There are two genera within the *Caliciviridae* family that are associated with acute gastroenteritis in humans: Norovirus, previously described as “Norwalk-like virus” (NLV); and Sapovirus, formerly described as “Sapporo-like virus” (SLV). Noroviruses are named after the original strain, “Norwalk virus,” that caused an outbreak of gastroenteritis in Norwalk, Ohio in 1968.

B. Clinical Description

Norovirus infection typically presents with an acute onset, and the symptoms generally include some combination of nausea, vomiting, watery, non-bloody diarrhea, and abdominal cramps and discomfort. Low-grade fever occasionally occurs, and vomiting is more common in children. Other symptoms can include headache, malaise, chills, and muscle aches. Dehydration is the most common complication, especially among the young and elderly. Symptoms generally last 24–48 hours, followed by complete recovery. There is no evidence of long-term sequelae following infection, although post-gastroenteritis arthritis has been described following norovirus infection, as with gastroenteritis due to other agents.

C. Vectors and Reservoirs

Humans are the only known reservoir of calicivirus (norovirus and sapovirus) infection.

D. Modes of Transmission

Transmission of noroviruses and sapoviruses is primarily by person-to-person spread via the fecal-oral route or through contaminated food or water. Contaminated fomites can also potentially transmit these organisms and can cause infection. Evidence also exists for transmission of norovirus through aerosolization of vomitus that may then contaminate fomites or inadvertently enter the oral mucosa and be ingested.

E. Incubation Period

The incubation period for calicivirus (norovirus and sapovirus) infection is usually between 24–48 hours, but the range is from 10–72 hours.

F. Period of Communicability or Infectious Period

While some viral shedding may occur prior to the onset of symptoms, shedding typically begins with the onset of symptoms and can occur for several days after recovery. Noroviruses are highly contagious, and it is believed that a dose of as few as ten viral particles may be sufficient to cause infection.

G. Epidemiology

Human calicivirus infection has a worldwide distribution. In the U.S., noroviruses are believed to be one of the most common causes of foodborne illness. The Centers for Disease Control and Prevention (CDC) estimates that at least 50% of all foodborne outbreaks of acute gastroenteritis are attributable to noroviruses.

Most foodborne outbreaks of norovirus illness are likely caused by contamination of food by a food handler immediately before consumption. Food items frequently associated with outbreaks include cold foods such as salads, sandwiches, and bakery products, as well as salad dressings and cake icing. Some food items, like oysters and berries, may be contaminated prior to arriving at a store or restaurant due to prior contact with contaminated water.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.



Section 2:

REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report a case that meets any of the following criteria:

- ◆ Identification of infection in stool, vomitus, or serum specimen (laboratory confirmation by enzyme immunoassay [EIA], reverse transcriptase polymerase chain reaction [RT-PCR], or serology); or
- ◆ A clinically compatible case that is epidemiologically linked to a laboratory-confirmed case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI), Enteric Laboratory uses RT-PCR to test clinical specimens for the presence of norovirus. Testing is performed for outbreak investigations only and with prior approval from the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850. A minimum of 3–5 specimens must be submitted per outbreak. Specimens will not be accepted for routine diagnostic purposes. Fresh stool is preferred, but vomitus is also acceptable. Stool specimens must be collected within 48 hours from symptom onset, either in a sterile container without transport medium or in a Meridian Para-Pak stool collection container. Vomitus must be submitted in a sterile container without transport medium. All specimens must be transported on ice and received cold within 48 hours of collection. Approved specimens must be accompanied by a completed *Norovirus Approval Form* (one form per outbreak; form is found at the end of this chapter), as well as the standard SLI *Specimen Submission Form* (one form per specimen; form is found at the end of this chapter and is available on the MDPH website at www.mass.gov/dph/bls/generalform.pdf).

For more information on testing and specimen submission, call the SLI Enteric Laboratory at (617) 983-6609.



Section 3:

REPORTING RESPONSIBILITIES AND CASE INVESTIGATION**A. Purpose of Surveillance and Reporting**

- ◆ To identify whether the case may be a source of infection for other persons (e.g., a diapered child, daycare attendee, or food handler), and if so, to prevent further transmission.
- ◆ To identify transmission sources of public health concern (e.g., a contaminated public water supply), and to stop transmission from such a source.

B. Laboratory and Health Care Provider Reporting Requirements

Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus are reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, shall report such evidence of infection directly to the MDPH within 24 hours.

All outbreaks of illness that are possibly foodborne are also reportable.

C. Local Board of Health (LBOH) Reporting and Follow-up Responsibilities*Reporting Requirements*

MDPH regulations (*105 CMR 300.000*) stipulate that Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection is reportable to the LBOH and that each LBOH must report any case or suspect case of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using an official MDPH *Enteric Disease Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

Case Investigation

1. It is the responsibility of the LBOH to complete a MDPH *Enteric Disease Case Report Form* (found at the end of this chapter) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the health care provider or from the medical record.
2. Use the following guidelines to assist in completing the form:
 - a. Accurately record the demographic information of the case as well as the date of symptom onset, symptoms, and clinical information.
 - b. When asking about exposure history (e.g., food, travel, activities), if possible, use the entire incubation period range of norovirus (10–72 hours). Specifically, however, focus on the 1–2 days prior to the case's onset, which is the usual range.

- c. If possible, record any restaurants at which the case ate, including food item(s) and date(s) of consumption. If you suspect that the case became infected through food, use the *MDPH Foodborne Illness Complaint Worksheet* (found at the end of this chapter) to facilitate recording additional information. It is requested that the LBOH fax or mail this worksheet to the MDPH Center for Environmental Health, Food Protection Program (FPP); see top of worksheet for fax number and address. This information is entered into a database to help link other complaints from neighboring towns, thus helping to identify foodborne illness outbreaks.

Note: This worksheet does not replace the MDPH Enteric Disease Case Report Form.

- d. Ask questions about travel history and outdoor activities to help identify where the case became infected.
 - e. Ask questions about water supply and exposure because norovirus may be acquired through water consumption.
 - f. Household/close contact, pet or other animal contact, daycare, and food handler questions are designed to examine the case's risk of having acquired the infection from or the case's potential for transmitting it to these contacts. Determine whether the case attends or works at a daycare facility and/or is a food handler.
 - g. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the case report form with as much information as you have gathered. Please note on the form the reasons why it could not be filled out completely.
3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked "Confidential") to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.



Section 4:

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.130*)

Food handling facility employees who test positive for Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus shall be excluded from food handling duties for either 72 hours past the resolution of symptoms or 72 hours past the date the positive specimen was provided, whichever occurs last. In outbreak circumstances consistent with Norwalk virus, Norwalk-like virus, norovirus, or other calicivirus infection affecting patrons or food handlers, food handling facility employees may be required to provide stool specimens for testing.

Note: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider. See Glossary (at the end of this manual) for a more complete definition.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Daycare

Since Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection may be transmitted from person to person through fecal-oral transmission, it is important to follow up on cases in a daycare setting carefully. General recommendations include:

- ◆ Children with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have diarrhea should be excluded until 72 hours after the resolution of symptoms.
- ◆ Children with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.

School

Since Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection may be transmitted from person to person through fecal-oral transmission, it is important to follow up on cases in a school setting carefully. The *MDPH Comprehensive School Health Manual* provides detailed information on enteric disease case follow-up and control in a school setting. General recommendations include:

- ◆ Students or staff with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have diarrhea should be excluded until 72 hours past the resolution of symptoms.
- ◆ Students or staff with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, who do not handle food, have no diarrhea or have mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken.
- ◆ Students or staff who handle food and have Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection must not prepare food until 72 hours past the resolution of symptoms or 72 hours past the date a positive specimen was provided, whichever occurs last (per *105 CMR 300.130*).

Refer to Chapter 8 of the *MDPH Comprehensive School Health Manual* for complete guidelines on handling diseases spread through the intestinal tract.

Community Residential Programs

Actions taken in response to a case of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection in community residential programs will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection should be placed on standard plus contact precautions until 72 hours past the resolution of symptoms.

(See the MDPH Division of Epidemiology and Immunization's *Control Guidelines for Long-Term Care Facilities* for further actions. A copy can be obtained on the MDPH website at www.mass.gov/dph/cdc/epii/lcfc/lcfc.htm or by calling the MDPH Division of Epidemiology and Immunization at [617] 983-6800 or [888] 658-2850.) Staff members who provide direct patient care (e.g., feed patients, give mouth or denture care, give medications) are considered food handlers and are subject to food handler restrictions under *105 CMR 300.130*. In addition, staff members with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who are not food handlers should not return to work until their diarrhea is gone.

In residential facilities for the developmentally disabled, staff and clients with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection must refrain from handling or preparing food for either 72 hours past the resolution of symptoms or 72 hours past the date the positive specimen was provided, whichever occurs last (per *105 CMR 300.130*). In addition, staff members with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who are not food handlers should not return to work until their diarrhea is gone.

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle (e.g., water or food, or association with a daycare center) should be sought, and applicable preventive or control measures should be instituted. Control of person-to-person transmission requires special emphasis on personal hygiene and sanitary disposal of feces and vomitus. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

Note: Refer to the MDPH's Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. Copies of this manual have been made available to LBOH. It is also available on the MDPH website in PDF format at www.mass.gov/dph/fpp/refman.htm. For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at www.mass.gov/dph/fpp.

D. Preventive Measures

Personal Preventive Measures/Education

To avoid exposure, recommend that individuals:

- ◆ Always wash their hands thoroughly with soap and warm water before eating or preparing food, after using the toilet, and after changing diapers.
- ◆ Wash own hands as well as the child's hands after changing a child's diaper.
- ◆ Dispose of feces and vomitus in a sanitary manner.
- ◆ Always wash their hands with plenty of soap and warm water if they are caring for someone who has vomited or has diarrhea, particularly after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes, or soiled sheets. Hands should be scrubbed for at least 15–20 seconds after cleaning the bathroom; after using the toilet or helping someone use the toilet; after changing diapers; before handling food; and before eating.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g. dental dam) may prevent the spread of norovirus to a case's sexual partners and may prevent exposure to and transmission of other fecal-oral pathogens.

A Norovirus Public Health Fact Sheet is available from the MDPH Division of Epidemiology and Immunization or on the MDPH website at www.mass.gov/dph. Click on the “Publications and Statistics” link, and select the “Public Health Fact Sheets” section under “Communicable Disease Control.”



ADDITIONAL INFORMATION

There is no formal CDC surveillance case definition for Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection. For reporting to the MDPH, always use the criteria outlined in Section 2A.



REFERENCES

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FORMS & WORKSHEETS

Norovirus & Other Caliciviruses

Norovirus & Other Caliciviruses

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LBOH Action Steps

This form does not need to be submitted to MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to calicivirus case investigation activities.

LBOH staff should follow these steps when calicivirus is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation, and follow-up, refer to the preceding chapter.

- ☐ Notify the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850, to report any confirmed case(s) of calicivirus.
- ☐ Obtain laboratory confirmation.
- ☐ For calicivirus suspected to be the result of food consumption, complete a MDPH *Foodborne Illness Complaint Worksheet* and forward to the MDPH Center for Environmental Health, Food Protection Program (FPP).
- ☐ Identify other potential exposure sources, such as a water source.
- ☐ Determine whether the case attends or works at a daycare facility and/or is a food handler.
- ☐ Identify other potentially exposed persons.
- ☐ Fill out the case report form (attach laboratory results).
- ☐ Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).